Curriculum Vitae

Dr. Dmitry Bandurin

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Education

- Ph.D. in Physics, Joint Institute for Nuclear Research (JINR, Dubna), June, 2004;
- M.S. in Theoretical and Nuclear Physics, Saratov State University and University Scientific Center by JINR. Graduated with a highest distinction (*Summa Cum Laude*).

Research experience

Primary author of 26 papers in major peer-reviewed physics journals and 15 papers published in proceedings of international conferences. More than 40 talks are given at conferences and seminars.

2000 – present: D0 Experiment (Fermi National Accelerator Laboratory [Fermilab], USA)

- Primary author of 15 physics measurements.
- Convener of physics group "Quantum Chromodynamics" (2009 – present):
  The group (about 80 scientists) studies processes with parton strong interactions. As a leader of the group, I have been responsible for selecting physics topics, communication with analysers, their technical and other support, reviewing physics analyses and papers. During my leadership of the group, 28 measurements, covering most challenging aspects of QCD, have been published and submitted to journals (8 of them have now > 50 citations).
- Convener of physics group "Jet Energy Scale" (2011 – present):
  The goal of the group (about 30 scientists) is developing methods and providing energy scale corrections for hadronic jets identified in the calorimeter, separately for different physics processes. The accuracy of the corrections is crucial for most of the experimental results. The JES method developed in D0 is the most precise in the world ($1 - 2\%$ accuracy for the most of phase space).
- Member of Jet Energy Scale Certification Board (2007 – 2011):
  Review of results of the Jet Energy Scale physics group.
- Convener of "Electron and Photon Identification" group (2007 – 2009):
  The main goal of the group (about 25 scientists) is providing software tools and methods for a reliable identification of electromagnetic objects (electrons and photons) in the D0 detector. I am a co-author of e/γ software identification tools used in the D0 collaboration. As a leader of the group I was responsible for developing and improving electron and photon identification criteria, their software implementation, and periodic validation.
- Development and support of software tools to calculate electron trigger efficiencies (2008 – 2009).
- Trigger Board representative from Electroweek group (2006 – 2007):
  Optimization of electron trigger selections in the high luminosity environment.
- Development of photon identification criteria (2004 – 2009).
- Support of software tools for monitoring the muon system (2001 – 2003)
- Software implementation of a new method for unfolding physical distributions in data (2010–2011):
  The method allows to minimize uncertainty of the unfolding procedure by optimization of binning, and a proper regularization of smearing matrix.
- Development of a new method for determining jet origin vertex in multiple $p\bar{p}$ collisions (2009).
- Study and corrections for energy saturation effects of electromagnetic objects and jets (2007–2010).
- Calorimeter and Muon system shifts to operate the D0 detector (2000 – 2011).

1997 – present: CMS Experiment (European Organization for Nuclear Research [CERN], Switzerland)

- Primary author of 2 physics measurements.
- R&D for CMS ECAL upgrade in Phase 2; beam test and analysis of first prototypes (2013).

- Development of data-driven methods to estimate background in measurements of the $Z \to ee, W \to e\nu$ cross sections using first CMS data (2009–2010).
- Development of Level 1 and High Level Triggers, identification tools for low energy electrons; optimization of High Level Triggers for general single electron selection (2008–2009).
- Development of algorithm for reconstruction of the clusters in the CMS preshower detector (implemented in the official reconstruction code) (2006–2007).
- Development of a method for improving energy resolution of electrons/photons in the CMS calorimeter (implemented in the official software) (2006–2007).
- Electromagnetic calorimeter calibration using the test beam data in the barrel region (2006).
- Hadronic calorimeter calibration using the very forward calorimeter test beam data (1999).
- Development of a method for setting jet energy scale using "γ/Z^0+jet" events (1996–1999).

1998 – 1999: HERA-B Experiment (Deutsches Elektronen-Synchrotron [DESY], Germany)

- Work in the transition radiation detector and calorimeter groups. Detector simulation of the physics processes; development of tools for a global alignment of the HERA-B subdetectors.

Research Interests

– Quantum chromodynamics: multiple parton interactions, hadron structure functions, photon physics;
– Physics beyond Standard Model.

Employment History

- Feb. 2010 – present: Department of Physics, Florida State University, Research Scientist.
- Jan. 2006 – Jan. 2010: Department of Physics, Kansas State University, Research Scientist.
- 2000 – 2005: JINR, Laboratory of Nuclear Problems, Research Fellow.
- 1994 – 2000: JINR, Laboratories of Theoretical and Particle Physics, Research Assistant.

Students

During my work at D0 and CMS experiments I have supervised many PhD students. The supervision resulted in finished measurements, each of which has been a major part of the student's PhD thesis:
Dan Duggan [Florida State University; now postdoc at Rutgers University]; Xuebing Bu [Univ. of Sci. and Tech. of China; now postdoc at Fermilab]; Zdenek Hubacek [Czech Technical University, now postdoc in Saclay]; Ken Smith [State University of New York, now postdoc]; Georgy Golovanov [Joint Institute for Nuclear Research]; Alexander Verkheev [Joint Institute for Nuclear Research]; Arnab Pal [University of Texas at Arlington]; Jeremy Werner [Princeton University, now postdoc].

Teaching

- "QCD measurements at the Tevatron" (seminars for CMS Summer students, 2009).
- "Object-oriented data analysis in high energy physics" (JINR, 2003–2004).
- "Computing in high energy physics" (Dubna University, 2002–2003).
- "Quantum field theory" (JINR, 2002).

Other services

- Convener of session "QCD and Heavy Ion" at Hadron Collider Physics symposium, Kyoto, Japan, November 2012.
- Reviewer of the journal of abstracts "Physics" (1999–2007).

Languages: Russian (native), English (fluent), German (advanced), French (beginner).

Other info: US permanent resident, married.

Selected publications (with > 35 citations) with my primary authorship

- D0 Collaboration, "Measurement of the isolated photon cross section in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV", Phys.Lett. **B639**, 151 (2006) (104 citations).
- CMS Collaboration, "Measurements of inclusive W and Z cross sections in pp collisions at $\sqrt{s} = 7$ TeV at CMS", JHEP **1101**, 080 (2011) (90 citations).
- D0 Collaboration, "Double parton interactions in γ+3 jet events in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV", Phys.Rev. D. **81**, 052012 (2010) (65 citations).
- D0 Collaboration, "Measurement of the differential cross section for the production of an isolated photon with associated jet in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV", Phys.Lett. **B666**, 435 (2008) (54 citations).
- D0 Collaboration, "Measurements of the photon+b-jet and photon+c-jet cross sections in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV in D0 ", Phys.Rev.Lett. **102**, 192002 (2009) (40 citations).
- D0 Collaboration, "Measurement of Direct Photon Pair Production Cross Sections in $p\bar{p}$ Collisions at $\sqrt{s} =$ 1.96 TeV", Phys.Lett. B **690**, 108 (2010) (36 citations).

Conference talks

1. Workshop "Measuring Multiple Partonic Interactions at the LHC", Tel Aviv University, Tel Aviv, Israel, October 14-18, 2012, "MPI studies at D0".
2. Workshop "QCD at LHC", Michigan State University, USA, August 20-24, 2012, "Double parton scattering results at Tevatron and LHC".
3. 36 International Conference on high energy physics, Melbourne, Australia, July 4-11, 2012, "Jet and QCD physics at hadron colliders" (*Plenary talk*).
4. Workshop on the LHC physics, Chicago, USA, May 2-4, 2012, "Double parton interactions".
5. Moriond QCD and High Energy Interactions, La Thuile, Italy, March 10-17, 2012, "W/Z+Jets and W/Z+HF Production at the Tevatron".
6. Workshop on Multiple Parton Interactions at the LHC, DESY, Hamburg, Germany, 21-25 November, 2011, "Study of Multiple Parton Interactions at D0".
7. International Linear Collider Workshop, September 26-30, 2011, Granada, Spain, "QCD results at the Tevatron" (*Plenary talk*).
8. Meeting of Division of Particles and Fields of the American Physical Society, August 9-13, 2011, Providence, RI, USA, "Studies of multi-parton interactions in photon+jets events at D0".
9. XIX International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2011), Newport News, Virginia, USA, April 11-15, 2011, "QCD results from CDF and D0" (*Plenary talk*).
10. XIX International Workshop "DIS 2011", "Diphoton cross section measurement at D0".
11. Workshop "Standard Model Benchmarks at the Tevatron and LHC", Fermilab, November 19-20, 2010, "Jet production at D0".
12. Fermilab Joint Experimental-Theoretical Workshop on study of systematics to the Higgs boson searches, May 18, 2010, "QCD results from D0".
13. Meeting of Division of Particles and Fields of the American Physical Society, Detroit, MI, USA, July 27-31, 2009, "Photon+jets measurements at D0".
14. 10th International Conference on the Intersections of Particle and Nuclear Physics, San Diego, California, May 26-31, 2009, "Photon and jet measurements at D0".
15. 1st Joint Experimental-Theoretical Workshop on Energy Scaling of Hadron Collisions, Fermilab, April 2009, "Underlying Events in photon + 3 jets at D0".
16. Aspen 2008 Winter Conference, January 13 – 19, 2008, "QCD Physics Results at the Tevatron".
17. Photon 2007, International Conference on the Structure and Interactions of the Photon, Paris, "Measurement of photon+jet differential cross section".
18. 9th International Conference on the Intersections of Particle and Nuclear Physics, Puerto Rico, May 30 – June 3, 2006, "Photons and jets at the Tevatron".
19. XVI International Workshop on High-Energy Physics "Relativistic Nuclear Physics and Quantum Chromodynamics", June 17–22, 2002, Dubna.
20. IV International school "Actual problems of particle physics", Gomel, Belarus, August, 1997.

Seminars and other talks

1. Plenary session of D0 Collaboration meeting, Northern Illinois University, June 2013, "QCD group status and plans".
2. Plenary session of D0 Collaboration meeting, Fermilab, February 2013, "Jet Energy Scale".
3. Plenary session of D0 Collaboration meeting, Fermilab, October 2012, "QCD workshop summary".
4. Plenary session of D0 Collaboration meeting, Fermilab, May 2012, "QCD workshop summary".
5. Penn State University (State College), May 2012, "Multiple parton interactions at D0".
6. Plenary session of D0 Collaboration meeting, Fermilab, December 2011, "Jet energy scale setting at D0"
7. University of California (Davis), November 2011, "Multiple parton interactions".
8. Florida State University, talk devoted to DoE visit, October 2010.
9. Iowa State University, September 2010, "Study of multiple parton interactions at D0".
10. Argonne National Laboratory, September 2010, "Multiple parton interactions at the Tevatron".
11. Indiana University, March, 2010, "Double parton interactions: recent measurements and prospects".
12. Fermilab Joint Experimental-Theoretical Physics Seminar, December 2009, "Determination of α_s from inclusive jet production cross section and double parton interactions in γ+3 jet events".
13. Talks for the CMS Summer students, June 2009, "QCD at the Tevatron and prospects for CMS".
14. JTERM III CMS Workshop, January 2009, Fermilab, "Summary of Di-lepton group Workshop".
15. Plenary session of D0 Collaboration meeting, May 2008, Fermilab, "Electron and photon ID".
16. Plenary session of D0 Collaboration meeting, September 2007, "Summary of Lepton ID Workshop".
17. Kansas State University, talks devoted to DoE visit: August, 2006; August, 2007.
18. ATLAS JINR Physics Workshop, November, 2004, JINR, Dubna.
19. ATLAS JINR Physics Workshop, April, 2004, JINR, Dubna.
20. IV Scientific Conference of young scientists and specialists, February, 2000, JINR, Dubna.
21. All JINR seminar, August, 1997, Laboratory of Theoretical Physics, JINR, Dubna.
22. Over 60 talks during the D0 and CMS collaboration weeks and workshops.